

# Winter Survival Heater

You can construct a simple homemade heater that can be used in your vehicle, which could save your life, and is very easy to make. Items needed are as follows:

- An empty one pound coffee can or a 30 oz. fruit can
- A regular roll of white plain toilet paper not scented,(because of fumes)
- Four 8-ounce bottles of 70 percent isopropyl alcohol - again, plain unscented and do not use a higher percent alcohol
- Also an empty large popcorn can, I believe it is a 3 gallon size like the ones that you buy at Christmas
- Two aluminum square cake pans or pie pans ( without holes in the bottom)
- Matches or a lighter

Start your project by removing the cardboard core from the toilet paper, (not the cheap loose rolled type) and push the roll into the coffee or fruit can so the roll is below the rim. The coffee can will have some space above the roll; if you use a fruit can, the roll will be just a little below flush. Either can, the roll should fit firmly without space around the roll. A larger can will allow the paper to burn around the sides, which you don't want; also I found that a plastic lid from a peanut can will fit loosely on the fruit can. This lid is used for storage purposes.

To use the heater, pour about 2 or 3 ounces of alcohol onto the paper, the saturated paper will act as a wick which can be ignited with a match or lighter, I suggest keeping both on hand, each stored in separate sealed containers or sandwich bags to prevent fumes from soaking into the matches and lighter which render them useless (this was learned from giving demonstrations).

Operation: Use the heater to warm the vehicle up, then put the cake or pie pan over the can to extinguish the flame, as you don't need to run the heater after the vehicle is warm. You can also use the cake or pie pan to melt snow for drinking. **Do Not** eat snow, as it will bring down your body temperature. Four pints of isopropyl alcohol will keep a car at 60 to 70 degrees for 24 hours, so you can carry more if want.

Safety: Isopropyl alcohol does not produce carbon monoxide, but a window should be cracked open for fresh air while burning. The burner can will become hot at the top, and maybe warm at the bottom so perhaps you might want to put one pan under the burner. This extra pan could be used to water pets.

Warning: These heaters are safe, but make sure flame has been snuffed out before adding more alcohol.

The empty popcorn can be used to store items for a winter survival kit such as the burner, alcohol, pie tins, lighters and matches. Other items to include in your vehicle winter survival kit include: flashlight and extra batteries, winter type clothing (hats, gloves, extra pair of long johns, scarf), first aide kit including any medications needed, extra diapers for little ones, bottled water (allow room for expansion, as it will likely freeze), high energy types of food (candy, nuts, granola bars), small bag of sand or kitty litter for traction, bendable shovel, basic tool kit (leatherman, swiss army knife), paper towels or toilet paper, spare tire, signaling devices (flares), blankets and/or sleeping bags, windshield scraper, booster cables, tow rope or chain, compass and road maps, cell phones or ham radios, and finally a hand held NOAA Weather Radio.

Carry the popcorn can in the back seat rather than the trunk. If you slide in the ditch and end up with the trunk buried in a snowbank, have a frozen trunk lock, or have damage to the trunk; the trunk might not be able to be opened.

Dress appropriately when traveling across the high plains in the winter. How many times have you seen women driving alone in freezing temperatures dressed in heels, nylons and blouse and hear them say " my car has a good heater, and I have a cell phone"...teenagers with sneakers, blue jeans, and T-shirts... men with dress shoes, slacks, shirt and tie - when the fan belt breaks, or the gas line freezes, and it's usually many miles from anywhere? Last winter I stopped and helped a gelled-up trucker from El Paso, Texas (his first winter in Montana using number two diesel) that was using socks on his hands. After 30 minutes in the pickup he could finally feel his fingers, (his boss in Texas, didn't want to pay the tow fee to get the tractor pulled to the truck repair service garage and expected the mechanics to work on the truck out on the interstate, he finally relented and paid the \$45 towing fee when the mechanics refused to work on the truck out on in the cold). So be firm everyone, and demand that your family members dress for the unexpected, you might save their life.



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**Snow Measurement Guidelines (10-23-96) replaces form WS TA B-0-26; 9-79**

***It is essential for all observers to understand the importance of taking standard measurements in the prescribed consistent manner. Inconsistent observing and reporting methods result in incompatible data which can result in profoundly incorrect differences between stations and observers.***

Each season before the first snows come: *Review these instructions for measuring snow.* It is easy to forget what needs to be measured, especially in those parts of the country where snow falls infrequently:

- At the beginning of each snowfall/freezing season, remove the funnel and inner measuring tube of the eight-inch manual rain gauge to expose the 8-inch diameter overflow can so that it can more accurately catch frozen precipitation
- Put your snowboard(s) out and mark their location with a flag or some other indicator so they can be found after a new snowfall. They should be located in the vicinity of your station in an open location (not under trees, obstructions, or on the north side of structures in the shadows).
- Check your gauge to make sure there are no leaks. If there are leaks, take appropriate action.
- Once your equipment has been readied for winter you are prepared for taking snowfall measurements.

Observers should determine three values when reporting solid precipitation. They are:

***Measure and record the greatest amount of snowfall that has accumulated on your snowboard (wooden deck or ground if board is not available) since the previous snowfall observation.*** This measurement should be taken minimally once-a-day (but can be taken up to four times a day, see note below) and should reflect the greatest accumulation of new snow observed (in inches and tenths, for example, 3.9 inches) since the last snowfall observation. If you are not available to watch snow accumulation at all times of the day and night, use your best estimate, based on a measurement of snowfall at the scheduled time of observation along with knowledge of what took place during the past 24 hours. It is essential to measure snowfall (and snow depth) in locations where the effects of blowing and drifting are minimized. Finding a good location where snow accumulates uniformly simplifies all other aspects of the observation and reduces the numerous opportunities for error. In open areas where windblown snow cannot be avoided, several measurements may often be necessary to obtain an average depth and they should not include the largest drifts. Freezing rain (glaze ice) should never be reported as snowfall. This precipitation type is liquid precipitation and should be reported as such.

***Determine the total depth of snow, sleet, or ice on the ground.*** This observation is taken once-a-day at the scheduled time of observation with a measuring stick. It is taken by measuring the total depth of snow on exposed ground at a permanently-mounted snow stake or by taking the average of several depth readings at or near the normal point of observation with a measuring stick. When using a measuring stick, make sure the stick is pushed vertically into the snow until the bottom of the stick rests on the ground. Do not mistake an ice layer or crusted snow as "ground". The measurement should reflect the average depth of snow, sleet, and glaze ice on the ground at your usual measurement site (not disturbed by human activities). Measurements from rooftops, paved areas, and the like should not be made. Report snow depth to the nearest whole inch, rounding up when one-half inch increments are reached (example 0.4 inches gets reported as a trace (T), 3.5 inches gets reported as 4 inches). Frequently, in hilly or mountainous terrain, you will be faced with the situation where no snow is observed on south-facing slopes while snow, possibly deep, remains in shaded or north-facing areas. Under these circumstances, you should use good judgement to visually average and then measure snow depths in exposed areas within several hundred yards surrounding the weather station. For example, if half the exposed ground is bare and half is covered with six inches of snow, the snow depth should be entered as the average of the two readings, or three inches. When in your judgement, less than 50 percent of the exposed ground is covered by snow, even though the covered areas have a significant depth, the snow depth should be recorded as a trace (T). When no snow or ice is on the ground in exposed areas (snow may be present in surrounding forested or otherwise protected areas), record a "0". When strong winds have blown the snow, take several measurements where the snow was least affected by drifting and average them. If most exposed areas are either blown free of snow while others have drifts, again try to combine visual averaging with measurements to make your estimate.

***Measuring the water equivalent of snowfall since the previous day's observation.***

This measurement is taken once-a-day at your specified time of observation. Melt the contents of your gauge (by bringing it inside your home or adding a measured amount of warm water) and then pour the liquid into the funnel and smaller inner measuring tube and measure the amount to the nearest .01 inch (use NWS provided measuring stick) just as you use for measuring rainfall. Do not measure the melted precipitation directly in the large 8-inch outer cylinder. Make sure the inner measuring tube can't fall over when pouring the liquid back into it. If the melted water equivalent (including any added warm water) exceeds two inches and cannot fit into the measuring tube all at one time, then empty the full measuring tube and pour the remaining liquid from the large 8-inch outer cylinder into the emptied measuring tube. Then, add and record the water equivalent of the multiple measurements. If you added warm water to the gauge to melt the snow, make sure you accurately measure the amount of warm water added before pouring it into the gauge. Then, when you take your liquid measurement, subtract the amount of warm water added from the total liquid measurement to get your final liquid water equivalent of the snowfall.

